

Venezuelan government which is providing the necessary permits and guidance for our efforts. Collected specimens will be propagated through tissue culture for further distribution to scientists around the world.

TEPUIS will publish a scientific journal four times per year, as well as operating seed, plant, photo, and movie banks. TEPUIS will also sponsor guided expeditions through the tepuis of South America.

You can become a member of TEPUIS and receive the TEPUIS newsletter by making a contribution of \$25 - \$500 to support our research efforts. Contributions of \$100 or more will entitle you to one free plant specimen for each \$10 donated (\$100 = 10 plants, \$250 = 25 plants).

It is not our goal to become a commercial supplier. The aforementioned prices are only a guide to help us solicit funds to continue our research in South America. TEPUIS will also donate plant material to universities for research, and to commercial growers for further propagation and distribution.

As I depart for Venezuela, I would like to thank all of the members of ICPS who have already pledged their moral, monetary, and scientific support for our projects in South America. I look forward to sharing our results with you soon.

Insectivorous Flora of Sequoia National Park

By Thomas L. Engelhardt, P.O. 281, Lodgepole, Sequoia National Park, CA 93262

For the past seventeen years I have been actively involved in my advocacy, growing carnivorous plants; but throughout this time have never had the opportunity to observe and study them in the wild, until now. When I became a naturalist for the National Park Service, one of the first things I did was begin the search for these marvelous plants. I received a few tips from the veteran rangers on the staff, and utilizing many botanical references, tried to determine possible species diversity, distribution and localities.

Research has shown that in or in close proximity of the boundaries of Sequoia National Park there is one species of the family Droseraceae and four species of the family Lentibulariaceae. In the family Droseraceae, *Drosera rotundifolia* is the sole inhabitant of this 630 square mile preserve. From the family Lentibulariaceae it has been established that four species of the genus *Utricularia* are present: *Utricularia gibba*, *minor*, *vulgaris* and *intermedia*.

In mid June, after only a 15 minute search, I came upon *Drosera rotundifolia* in its moist, acidic, niche, within the Montane Meadow Community, surrounded along the perimeter by giant sequoias (*Sequoiadendron giganteum*). How exhilarating it was to see *Drosera rotundifolia* in its native habitat, hidden under a canopy of Sierra wildflowers and meadow grasses at an elevation of 6600 feet. The healthiest population of these glistening gems was in the wettest region of the meadowland, where some plants actually established themselves in a small tributary beneath two centimeters of water. In order to gain access to the sundews I utilized a fallen sequoia that traversed the bog as an observation point. Thus the fragility of the meadow was preserved and no damage to the delicate ecosystem could occur.

Plants growing in the full sun develop tight, robust, basal rosettes approximately 3.1 centimeters in diameter and dark crimson coloration. Plants hidden from the direct rays of the sun under taller vegetation, were lighter in color, and interestingly, possessed significantly longer petioles of approximately 4-5 centimeters.

At the end of the month I returned to find the same population covered with an array of attractive, white inflorescences and by the first of September, most of the *Drosera rotundifolia* had gone to seed and will begin the dissemination process.

Though a four month period of dormancy is quickly approaching, winter hibernacula were not observed as of the printing of this article.

My search for members of the genus *Utricularia* was, at first, futile. For days I explored numerous Sub-Alpine Meadow localities, at an elevation of 7680 feet, until one morning I came



Figure 1. Exploring the native habitat of *Drosera rotundifolia* in Sequoia National Park.

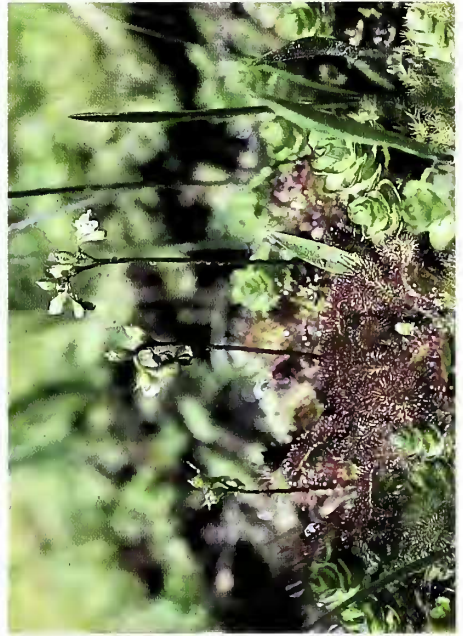
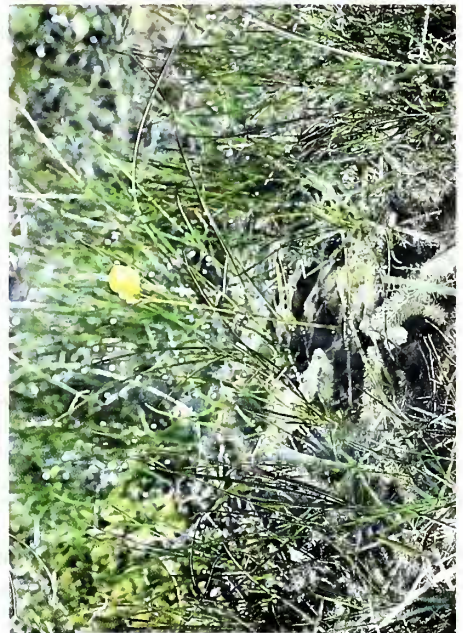


Figure 2. Dense populations of *Drosera rotundifolia* flourish in Sequoia National Park.
Note: Scapose white inflorescence.



Figures 3. *Drosera rotundifolia* stalking its prey!



Figures 4. *Utricularia intermedia* are highly visible during early July.
Note: The emergent inflorescence and the submerged trapping appendages.

upon an odd looking assortment of aquatic vegetation. Under closer scrutiny I had discovered a cornucopia of *Utricularia intermedia* (Flat-Leaved Bladderwort). Emergent flower scapes, with brilliant yellow corollas and possessing 8-10 distinct crimson markings, were present, but not numerous.

The identification of this species is not difficult, (unlike most members of this genus!). There are two distinct types of leaf morphology: one without bladders, very much crowded on the stems, two-ranked and 2-3 times divided with linear flat-leaves, and a second type with separate, colorless, leafless branches possessing bladders 2-5 millimeters in length. The leafless branches prefer to embed themselves in organic sediments, making the trapping mechanisms difficult to distinguish below the water surface. A winter, resting bud at the posterior end of the stem is also evident.

I located *Utricularia intermedia* in two ecotones: open meadows, which were exposed to direct sunlight and tranquil tributaries under aquatic vegetation. In some locals the water level was less than 2.56 centimeters and the temperatures exceeded 31 degrees Celsius.

Severe drought conditions have been evident all summer long across the Sierra Nevada mountain range. Since early June only .02 of an inch of measurable precipitation has occurred; thus when I returned to the locality in late August, I was not surprised to find the bogs completely dried up and the distribution of *Utricularia intermedia* completely absent.

Four kilometers down the road I found a small creek containing coffee-tinted waters indicating high levels of acidity. I decided to explore further and to my surprise, I located a free-floating species of bladderwort in a semi-shaded, quiet spot, dammed off by fallen trees. I identified it as the species *Utricularia minor*, an uncommon aquatic in the Sierra Nevada mountains, according to Munz, 1959.

The Lesser Bladderwort is slender stemmed, about 1-3 decimeters long, with few divisions and bearing 1-5 trapping mechanisms per petiole. *Utricularia minor* appears to have a few large leaves with flatten segments and no bladders, alternating among branches containing bladders. No flower scapes were present which would have helped taxonomic verification a great deal.

Although the literature states that both *Utricularia gibba* and *vulgaris* are also native to this region, I found no evidence to support that conclusion throughout my three month investigation.

For many millennia the giant sequoias have stood guard at the perimeter of these meadowlands. These inconspicuous little marvels, the insectivorous plants, are in my estimation just as inspiring as the three thousand year old giant redwoods that attract 2.5 million visitors to Sequoia National Park each year.

About the Author

Thomas L. Engelhardt is a naturalist at Sequoia National Park, a botany instructor at Rancho Santiago College, and spent four years as a botanical assistant with the South Coast Botanic Garden.

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